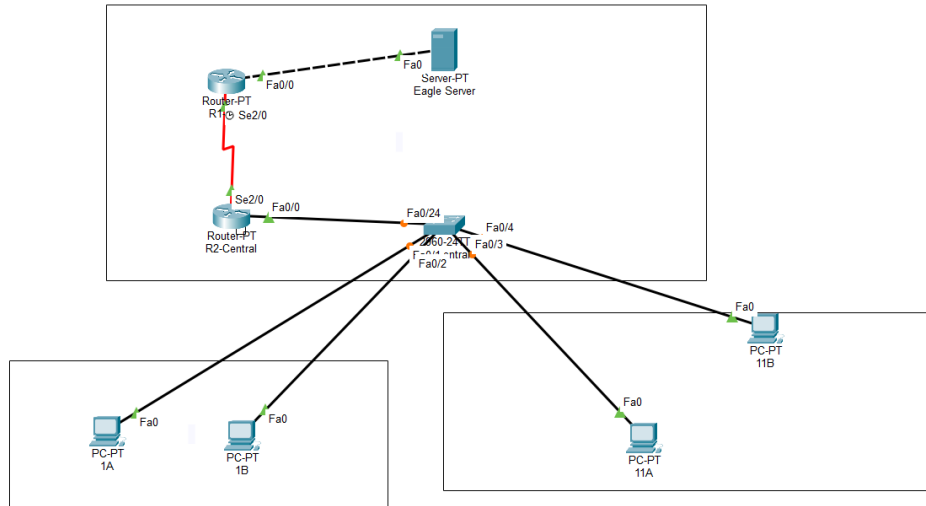


Lab01.Ping And Traceroute-01

Thiết kế sơ đồ mạng hoàn chỉnh



Thiết lập các thông số cho Eagle Server

Eagle Server

PhysicalConfigServicesDesktopProgrammingAttributes

IP Configuration

IP Configuration

☐ DHCP

☒ Static

IPv4 Address

192.168.254.254

Subnet Mask

255.255.255.0

Default Gateway

192.168.254.253

DNS Server

0.0.0.0

IPv6 Configuration

☐ Automatic

☒ Static

IPv6 Address

 /

Link Local Address

FE80::200:CFF:FE96:636A

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication

MD5

Username

Password

☐ Top

Thiết lập thông số cho các PC

1A

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

InterfaceFastEthernet0

IP Configuration

DHCP

Static

IPv4 Address

172.16.1.1

Subnet Mask

255.255.0.0

Default Gateway

172.16.255.254

DNS Server

0.0.0.0

IPv6 Configuration

Automatic

Static

IPv6 Address

/

Link Local Address

FE80::207:ECFF:FE28:10AE

Default Gateway

DNS Server

802.1X

Use 802.1X Security

Authentication

MD5

Username

Password

Top

1B

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

InterfaceFastEthernet0

IP Configuration

DHCP

Static

IPv4 Address

172.16.1.2

Subnet Mask

255.255.0.0

Default Gateway

172.16.255.254

DNS Server

0.0.0.0

IPv6 Configuration

Automatic

Static

IPv6 Address

/

Link Local Address

FE80::201:42FF:FEC1:8D20

Default Gateway

DNS Server

802.1X

Use 802.1X Security

Authentication

MD5

Username

Password

Top

11A

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

Interface

FastEthernet0

IP Configuration

DHCP

Static

IPv4 Address

172.16.11.1

Subnet Mask

255.255.0.0

Default Gateway

172.16.255.254

DNS Server

0.0.0.0

IPv6 Configuration

Automatic

Static

IPv6 Address

/

Link Local Address

FE80::201:97FF:FEE1:1451

Default Gateway

DNS Server

802.1X

Use 802.1X Security

Authentication

MD5

Username

Password

Top

11B

Physical Config Desktop Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP

☒ Static

IPv4 Address

172.16.11.2

Subnet Mask

255.255.0.0

Default Gateway

172.16.255.254

DNS Server

0.0.0.0

IPv6 Configuration

☐ Automatic

☒ Static

IPv6 Address

 /

Link Local Address

FE80::20A:41FF:FE09:234E

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication

MD5

Username

Password

☐ Top

Thiết lập switch S1-Central

S1-Central

Physical Config CLI Attributes

IOS Command Line Interface

```
Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/4, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/24, changed state to up

Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1-Central
S1-Central(config)#interface vlan 1
S1-Central(config-if)#ip address 172.16.254.1 255.255.0.0
S1-Central(config-if)#no shutdown

S1-Central(config-if)#
%LINK-3-UPDOWN: Interface Vlan1, changed state to down

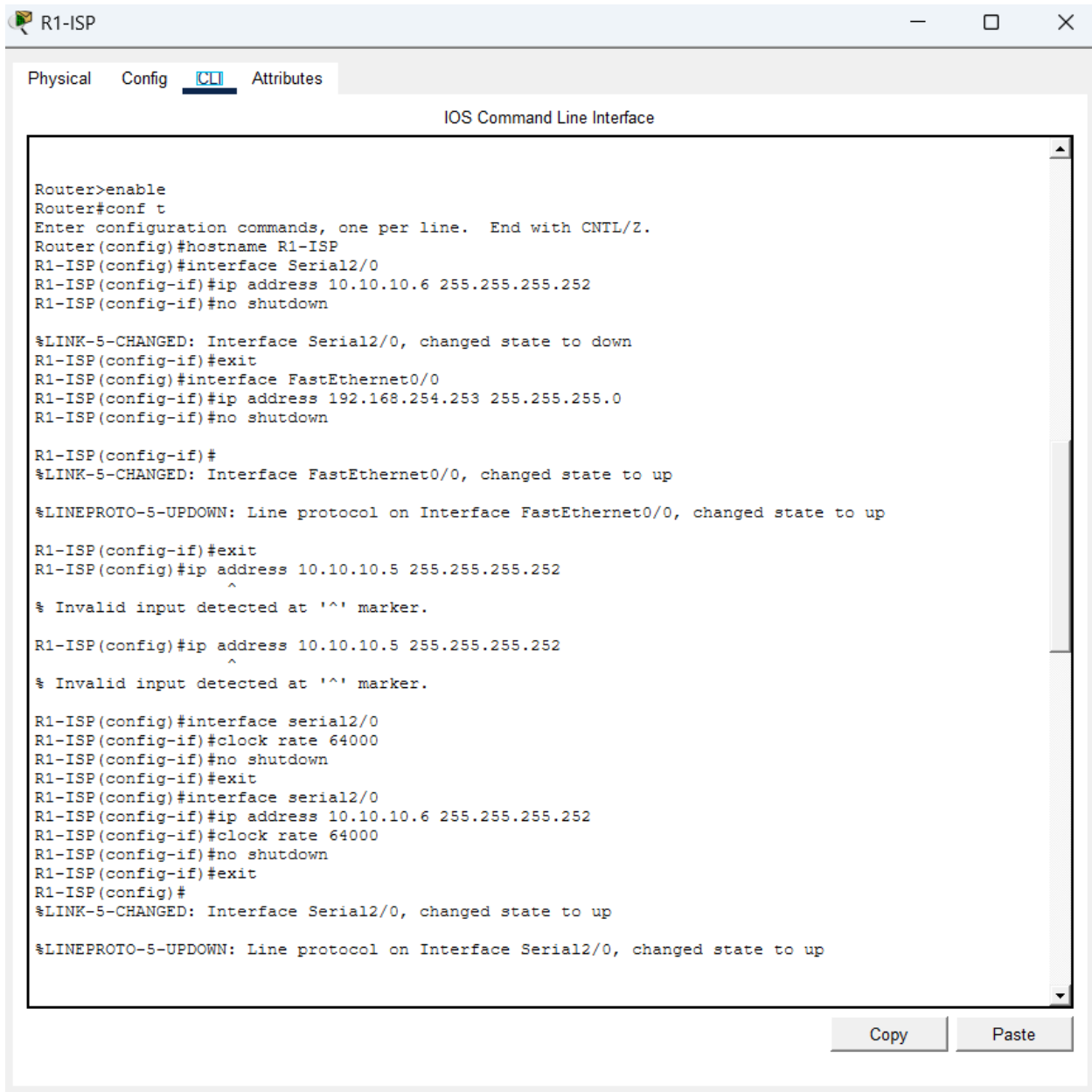
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

S1-Central(config-if)#exit
S1-Central(config)#ip default-gateway 172.16.255.254
S1-Central(config)#exit
S1-Central#
%SYS-5-CONFIG_I: Configured from console by console

S1-Central#
```

Copy Paste

Thiết lập router R1-ISP



The screenshot displays a window titled "R1-ISP" with a standard Windows-style title bar (minimize, maximize, close buttons). Below the title bar is a tabbed interface with three tabs: "Physical", "Config", and "Attributes". The "Config" tab is selected and highlighted in blue. The main content area is titled "IOS Command Line Interface" and contains a text box with the following text:

```
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1-ISP
R1-ISP(config)#interface Serial2/0
R1-ISP(config-if)#ip address 10.10.10.6 255.255.255.252
R1-ISP(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
R1-ISP(config-if)#exit
R1-ISP(config)#interface FastEthernet0/0
R1-ISP(config-if)#ip address 192.168.254.253 255.255.255.0
R1-ISP(config-if)#no shutdown

R1-ISP(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

R1-ISP(config-if)#exit
R1-ISP(config)#ip address 10.10.10.5 255.255.255.252
^
% Invalid input detected at '^' marker.

R1-ISP(config)#ip address 10.10.10.5 255.255.255.252
^
% Invalid input detected at '^' marker.

R1-ISP(config)#interface serial2/0
R1-ISP(config-if)#clock rate 64000
R1-ISP(config-if)#no shutdown
R1-ISP(config-if)#exit
R1-ISP(config)#interface serial2/0
R1-ISP(config-if)#ip address 10.10.10.6 255.255.255.252
R1-ISP(config-if)#clock rate 64000
R1-ISP(config-if)#no shutdown
R1-ISP(config-if)#exit
R1-ISP(config)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
```

At the bottom right of the window, there are two buttons: "Copy" and "Paste".

Thiết lập router R2-Central

 R2-Central

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface serial2/0
Router(config-if)#ip address 10.10.10.5 255.255.255.252
Router(config-if)#clock rate 64000
This command applies only to DCE interfaces
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Router(config-if)#exit
Router(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config)#ip route 192.168.254.0 255.255.255.0 10.10.10.6ip route 192.168.254.0 255.255.255.0
10.10.10.6^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 172.16.255.254 255.255.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

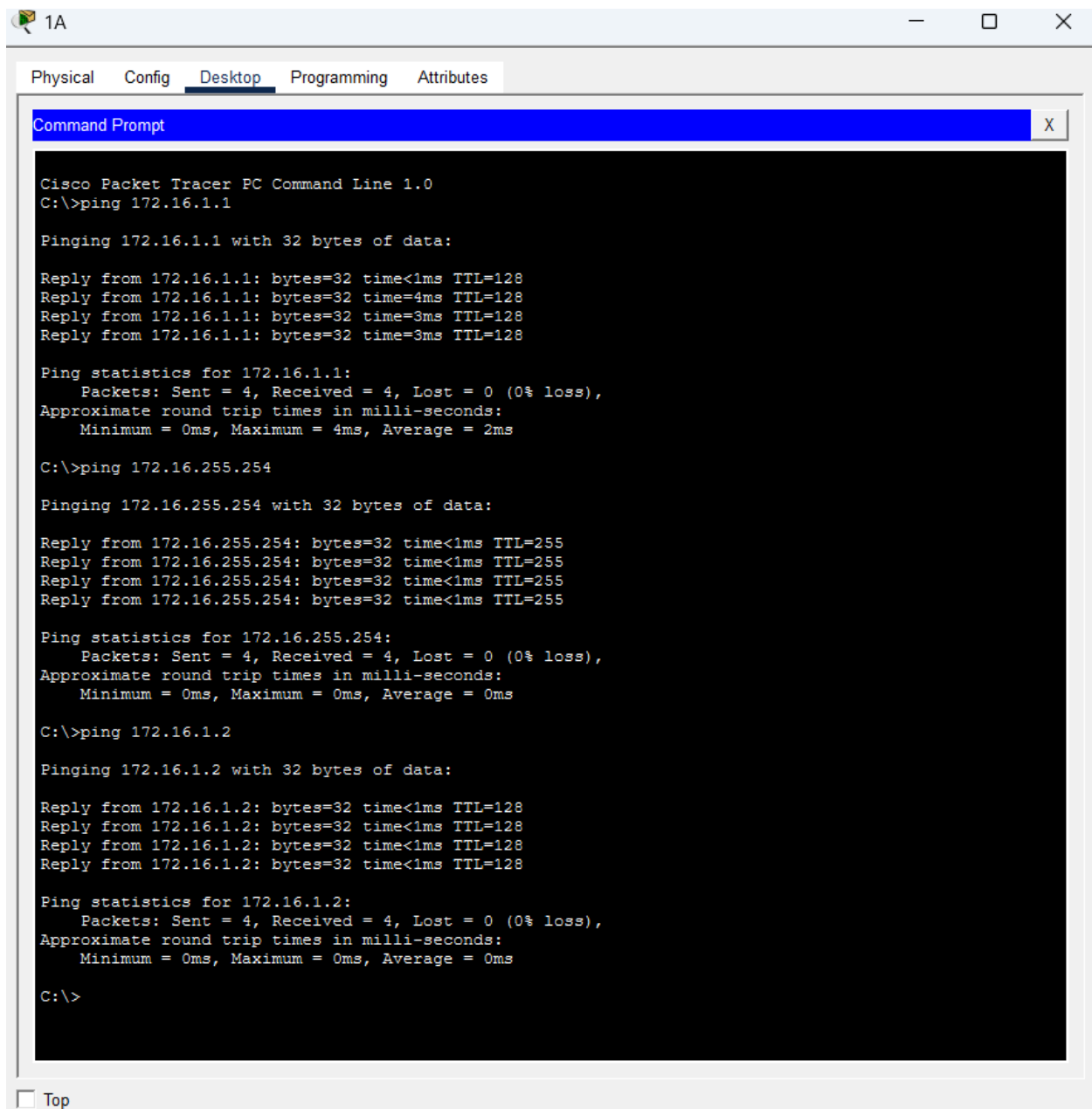
Router(config-if)#exit
Router(config)#ip route 192.168.254.0 255.255.255.0 10.10.10.6
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Copy Paste

☐ Top

Kiểm tra tất cả các đường truyền bằng lệnh ping và tracert



The screenshot shows a Cisco Packet Tracer PC Command Line window for a device named '1A'. The window has tabs for 'Physical', 'Config', 'Desktop', 'Programming', and 'Attributes', with 'Desktop' selected. The command prompt shows the following output:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.16.1.1

Pinging 172.16.1.1 with 32 bytes of data:

Reply from 172.16.1.1: bytes=32 time<1ms TTL=128
Reply from 172.16.1.1: bytes=32 time=4ms TTL=128
Reply from 172.16.1.1: bytes=32 time=3ms TTL=128
Reply from 172.16.1.1: bytes=32 time=3ms TTL=128

Ping statistics for 172.16.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 4ms, Average = 2ms

C:\>ping 172.16.255.254

Pinging 172.16.255.254 with 32 bytes of data:

Reply from 172.16.255.254: bytes=32 time<1ms TTL=255
Reply from 172.16.255.254: bytes=32 time<1ms TTL=255
Reply from 172.16.255.254: bytes=32 time<1ms TTL=255
Reply from 172.16.255.254: bytes=32 time<1ms TTL=255

Ping statistics for 172.16.255.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 172.16.1.2

Pinging 172.16.1.2 with 32 bytes of data:

Reply from 172.16.1.2: bytes=32 time<1ms TTL=128
Reply from 172.16.1.2: bytes=32 time<1ms TTL=128
Reply from 172.16.1.2: bytes=32 time<1ms TTL=128
Reply from 172.16.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 172.16.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

At the bottom left of the window, there is a checkbox labeled 'Top' which is currently unchecked.

1A

Physical Config Desktop Programming Attributes

Command Prompt

Reply from 192.168.254.254: bytes=32 time=12ms TTL=126
Reply from 192.168.254.254: bytes=32 time=13ms TTL=126
Reply from 192.168.254.254: bytes=32 time=8ms TTL=126

Ping statistics for 192.168.254.254:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 15ms, Average = 12ms

C:\>tracert 192.168.254.254

Tracing route to 192.168.254.254 over a maximum of 30 hops:

1 0 ms 0 ms 0 ms 172.16.255.254
2 3 ms 0 ms 0 ms 10.10.10.6
3 1 ms 0 ms 0 ms 192.168.254.254

Trace complete.

C:\>ping 10.10.10.6

Pinging 10.10.10.6 with 32 bytes of data:

Reply from 10.10.10.6: bytes=32 time=16ms TTL=254
Reply from 10.10.10.6: bytes=32 time=10ms TTL=254
Reply from 10.10.10.6: bytes=32 time=12ms TTL=254
Reply from 10.10.10.6: bytes=32 time=2ms TTL=254

Ping statistics for 10.10.10.6:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 16ms, Average = 10ms

C:\>ping 192.168.254.254

Pinging 192.168.254.254 with 32 bytes of data:

Reply from 192.168.254.254: bytes=32 time=14ms TTL=126
Reply from 192.168.254.254: bytes=32 time=1ms TTL=126
Reply from 192.168.254.254: bytes=32 time=9ms TTL=126
Reply from 192.168.254.254: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.254.254:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 14ms, Average = 6ms

C:\>

☐ Top

Giải thích các lệnh CLI:

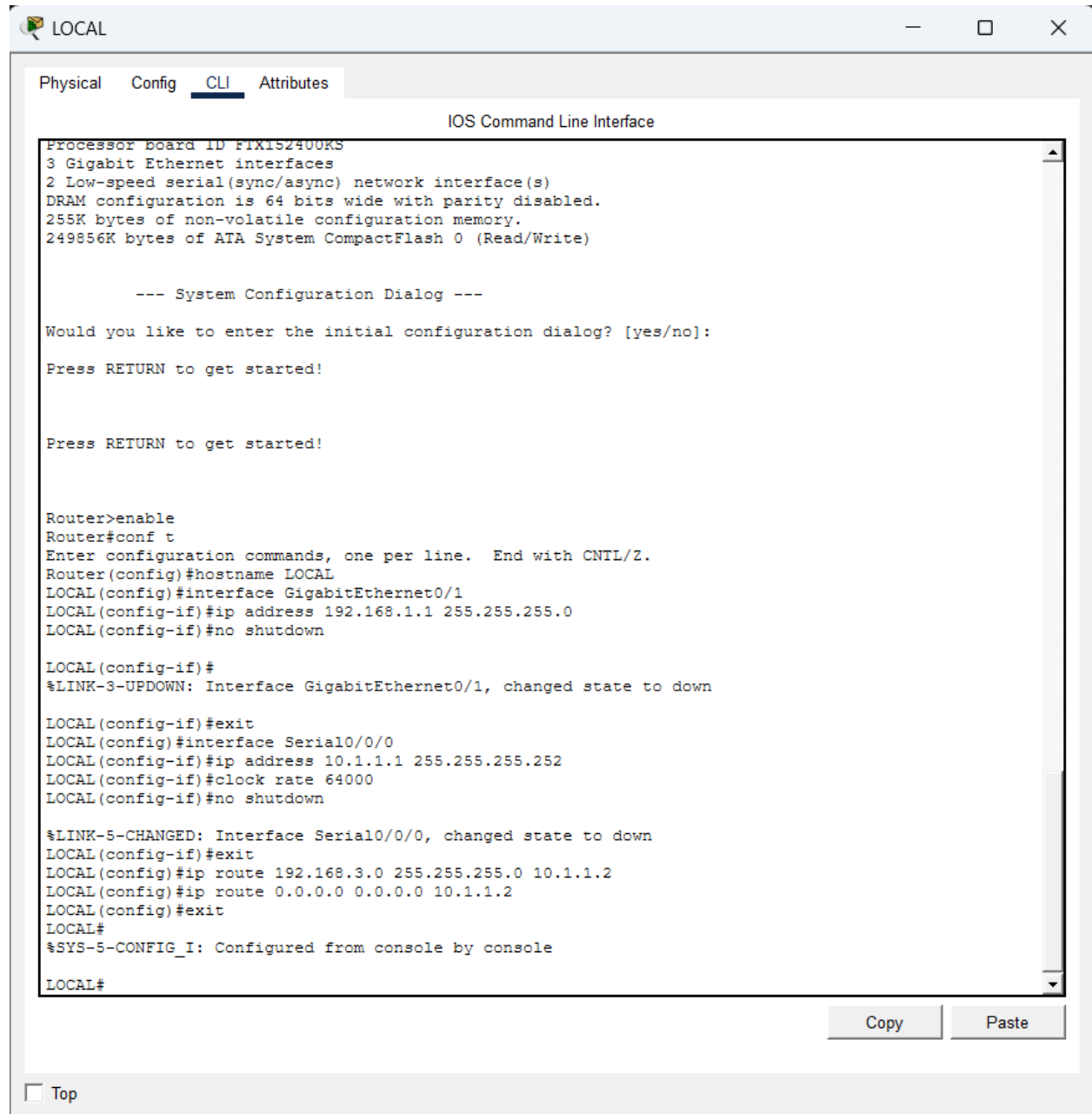
- enable: Chuyển sang chế độ privileged mode
- configure terminal(conf t): Vào chế độ cấu hình global
- hostname: Đặt tên cho router

- interface: Chọn interface để cấu hình
- ip address: Gán địa chỉ IP và subnet mask
- no shutdown: Bật interface (mặc định interface bị shutdown)
- exit: Thoát khỏi chế độ hiện tại
- ip route: Cấu hình default route

Lab01: Ping and Traceroute 02

1. Build and Configure the Network

Cấu hình router LOCAL



The screenshot shows a web-based interface for configuring a router named 'LOCAL'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The interface shows the following configuration steps and outputs:

```
Processor board ID F1X1S2400KS
3 Gigabit Ethernet interfaces
2 Low-speed serial(sync/async) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]:

Press RETURN to get started!

Press RETURN to get started!

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname LOCAL
LOCAL(config)#interface GigabitEthernet0/1
LOCAL(config-if)#ip address 192.168.1.1 255.255.255.0
LOCAL(config-if)#no shutdown

LOCAL(config-if)#
%LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state to down

LOCAL(config-if)#exit
LOCAL(config)#interface Serial0/0/0
LOCAL(config-if)#ip address 10.1.1.1 255.255.255.252
LOCAL(config-if)#clock rate 64000
LOCAL(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
LOCAL(config-if)#exit
LOCAL(config)#ip route 192.168.3.0 255.255.255.0 10.1.1.2
LOCAL(config)#ip route 0.0.0.0 0.0.0.0 10.1.1.2
LOCAL(config)#exit
LOCAL#
%SYS-5-CONFIG_I: Configured from console by console

LOCAL#
```

At the bottom of the CLI window, there are 'Copy' and 'Paste' buttons. Below the CLI window, there is a 'Top' link.

LOCAL

PhysicalConfigCLIAttributes

IOS Command Line Interface

```
LOCAL#show ip interface brief
Interface          IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0 unassigned      YES unset  administratively down down
GigabitEthernet0/1 192.168.1.1     YES manual  down        down
GigabitEthernet0/2 unassigned      YES unset  administratively down down
Serial0/0/0        10.1.1.1        YES manual  up          up
Serial0/0/1        unassigned      YES unset  administratively down down
Vlan1              unassigned      YES unset  administratively down down

LOCAL#conf t
Enter configuration commands, one per line. End with CNTL/Z.
LOCAL(config)#interface GigabitEthernet0/0
LOCAL(config-if)#ip address 192.168.1.1 255.255.255.0
% 192.168.1.0 overlaps with GigabitEthernet0/1
LOCAL(config-if)#no shutdown
% 192.168.1.0 overlaps with GigabitEthernet0/1
GigabitEthernet0/0: incorrect IP address assignment
LOCAL(config-if)#
LOCAL#
%SYS-5-CONFIG_I: Configured from console by console

LOCAL#
LOCAL#conf t
Enter configuration commands, one per line. End with CNTL/Z.
LOCAL(config)#interface GigabitEthernet0/1
LOCAL(config-if)#ip address 192.168.1.1 255.255.255.0
LOCAL(config-if)#no shutdown
LOCAL(config-if)#interface GigabitEthernet0/0
LOCAL(config-if)#ip address 192.168.1.1 255.255.255.0
% 192.168.1.0 overlaps with GigabitEthernet0/1
LOCAL(config-if)#interface GigabitEthernet0/1
LOCAL(config-if)#no ip address
LOCAL(config-if)#interface GigabitEthernet0/0
LOCAL(config-if)#ip address 192.168.1.1 255.255.255.0
LOCAL(config-if)#no shutdown
^
% Invalid input detected at '^' marker.

LOCAL(config-if)#no shutdown

LOCAL(config-if)#
%LINK-S-CHANGED: Interface GigabitEthernet0/0, changed state to up

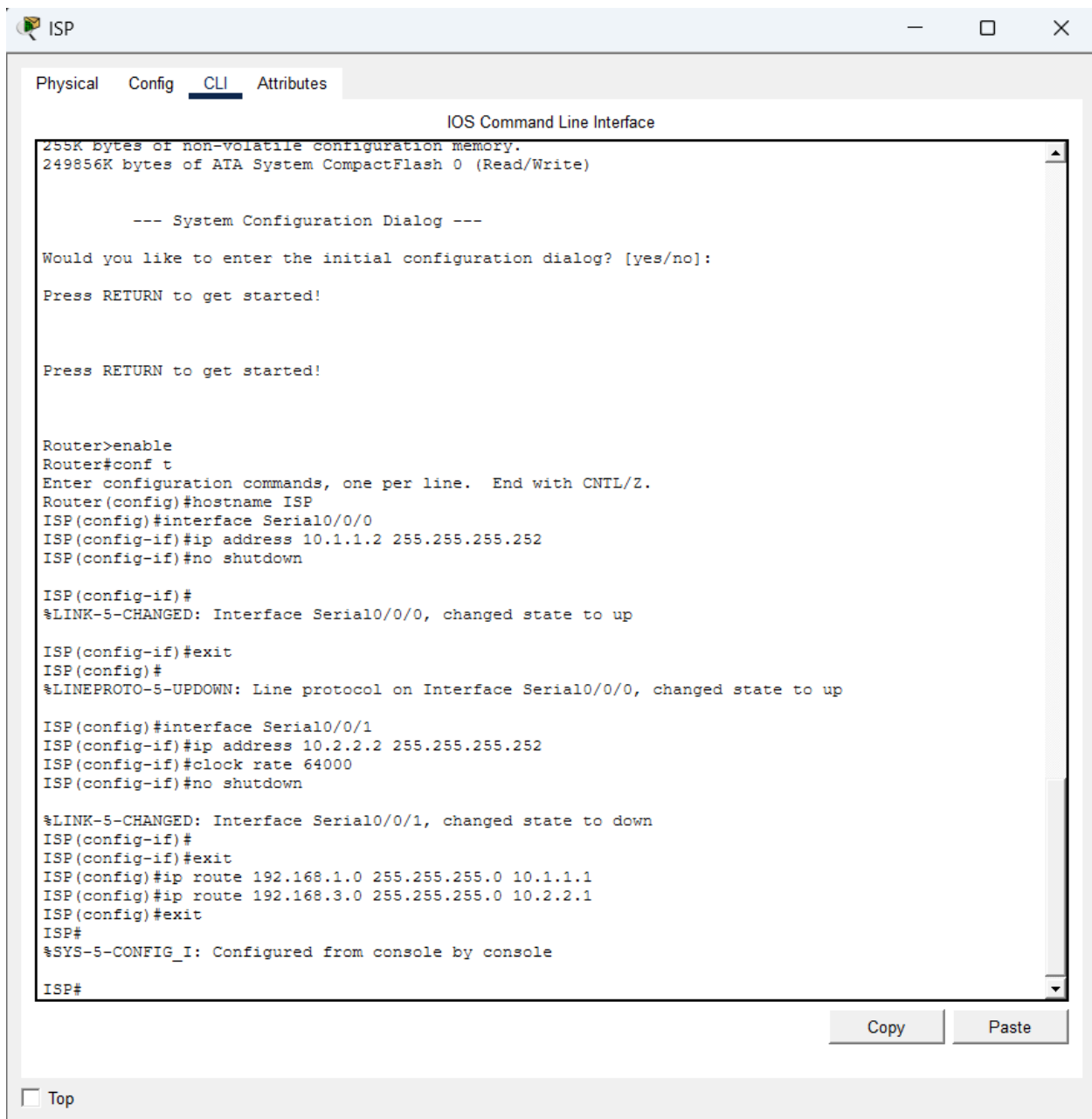
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

LOCAL(config-if)#
```

CopyPaste

☐ Top

Cấu hình router ISP



Cấu hình router REMOTE

 REMOTE

Physical

Config

CLI

Attributes

IOS Command Line Interface

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]:
% Please answer 'yes' or 'no'.
Would you like to enter the initial configuration dialog? [yes/no]: n
% Please answer 'yes' or 'no'.
Would you like to enter the initial configuration dialog? [yes/no]: no
% Please answer 'yes' or 'no'.
Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname REMOTE
REMOTE(config)#interface GigabitEthernet0/1
REMOTE(config-if)#ip address 192.168.3.1 255.255.255.0
REMOTE(config-if)#no shutdown

REMOTE(config-if)#
%LINK-3-UPDOWN: Interface GigabitEthernet0/1, changed state to down

REMOTE(config-if)#exit
REMOTE(config)#interface Serial0/0/1
REMOTE(config-if)#ip address 10.2.2.1 255.255.255.252
REMOTE(config-if)#no shutdown

REMOTE(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

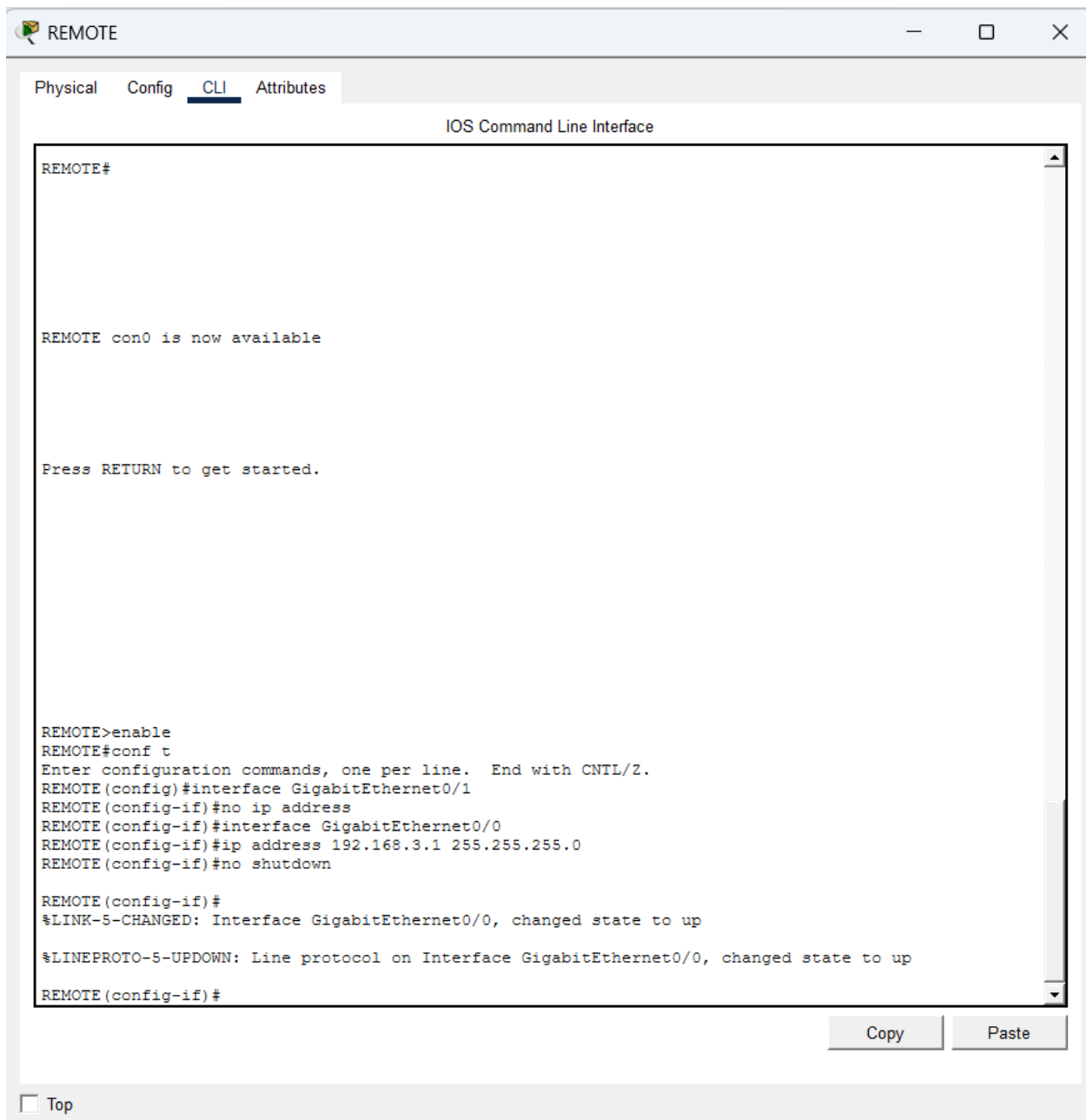
REMOTE(config-if)#exit
REMOTE(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

REMOTE(config)#ip route 192.168.1.0 255.255.255.0 10.2.2.2
REMOTE(config)#ip route 0.0.0.0 0.0.0.0 10.2.2.2
REMOTE(config)#exit
REMOTE#
%SYS-5-CONFIG_I: Configured from console by console
REMOTE#

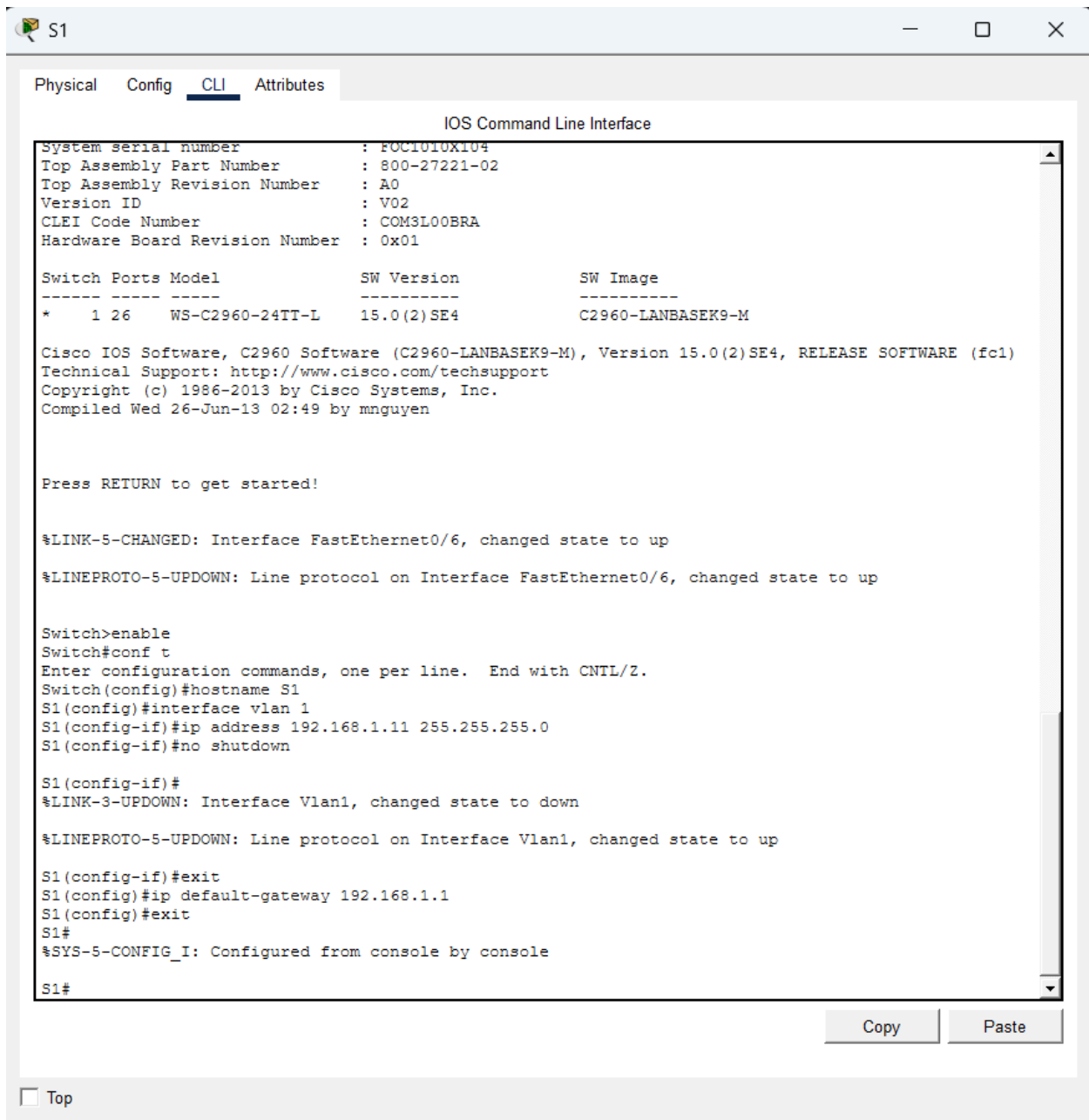
Copy

Paste

☐ Top



Cấu hình switch S1



Cấu hình switch S3

S3

PhysicalConfigCLIAttributes

IOS Command Line Interface

```
System serial number       : FOC1010X104
Top Assembly Part Number   : 800-27221-02
Top Assembly Revision Number : A0
Version ID                 : V02
CLEI Code Number          : COM3L00BRA
Hardware Board Revision Number : 0x01

Switch Ports Model          SW Version        SW Image
-----
* 1 26 WS-C2960-24TT-L 15.0(2)SE4 C2960-LANBASEK9-M

Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2013 by Cisco Systems, Inc.
Compiled Wed 26-Jun-13 02:49 by mnguyen

Press RETURN to get started!

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up

Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S3
S3(config)#interface vlan 1
S3(config-if)#ip address 192.168.3.11 255.255.255.0
S3(config-if)#no shutdown

S3(config-if)#
%LINK-3-UPDOWN: Interface Vlan1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

S3(config-if)#exit
S3(config)#ip default-gateway 192.168.3.1
S3(config)#exit
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#
```

CopyPaste

☐ Top

Cấu hình PC-A

PC-A

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.1.3

Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::209:7CFF:FEDA:AE3

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

Top

Cấu hình PC-C

PC-C

Physical

Config

Desktop

Programming

Attributes

IP Configuration

X

InterfaceFastEthernet0

IP Configuration

DHCP

Static

IPv4 Address192.168.3.3

Subnet Mask255.255.255.0

Default Gateway192.168.3.1

DNS Server0.0.0.0

IPv6 Configuration

Automatic

Static

IPv6 Address/

Link Local AddressFE80::260:5CFF:FED4:17CB

Default Gateway

DNS Server

802.1X

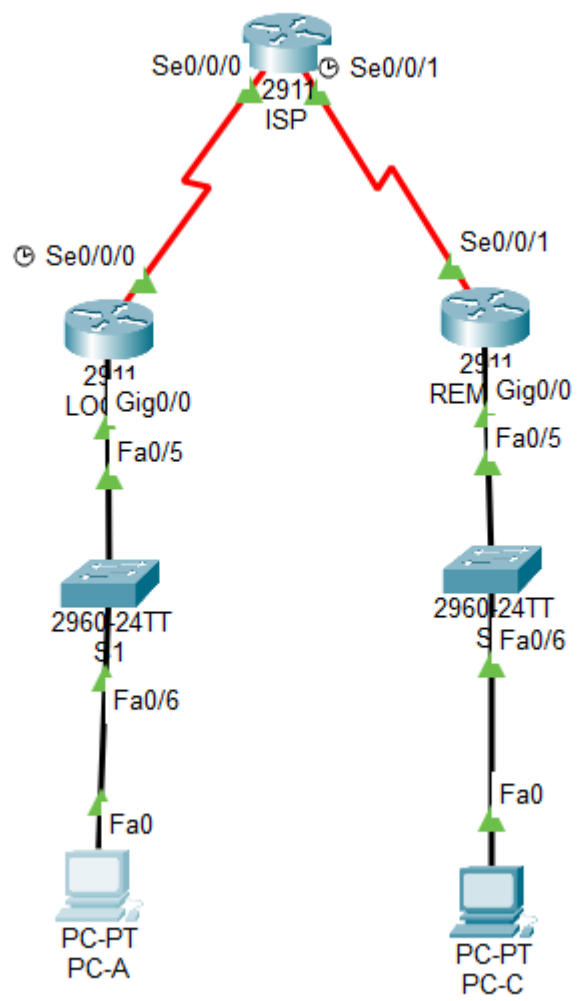
Use 802.1X Security

AuthenticationMD5

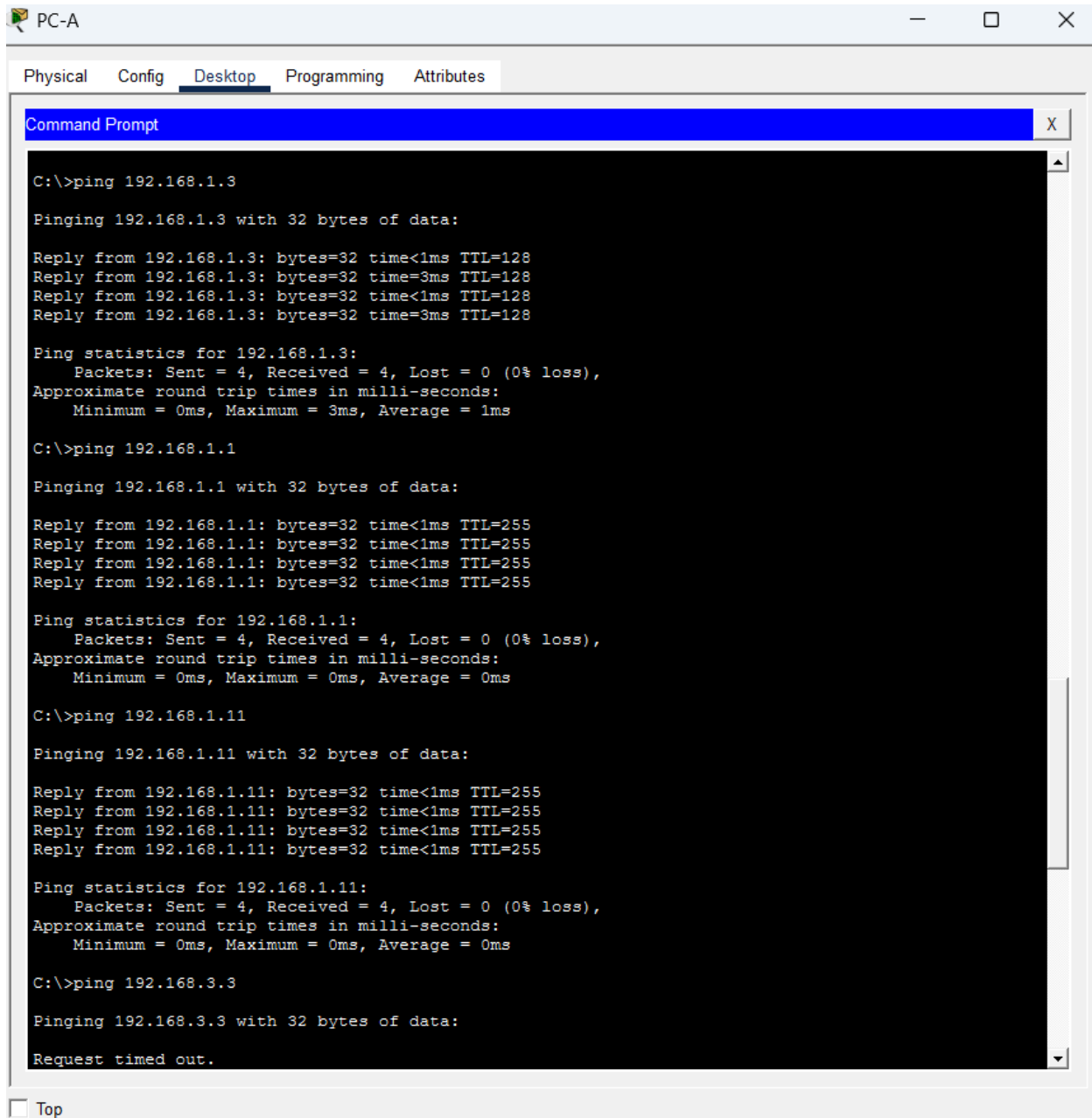
Username

Password

Top



2. Use Ping Command for Basic Network Testing



The screenshot shows a window titled "PC-A" with a tabbed interface. The "Desktop" tab is active, displaying a "Command Prompt" window. The Command Prompt shows the execution of three ping commands: `ping 192.168.1.3`, `ping 192.168.1.1`, and `ping 192.168.1.11`. Each command is followed by its output, including the number of bytes, time, and TTL for each of the four replies, and then the ping statistics (Packets: Sent, Received, Lost, and Approximate round trip times).

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=3ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time=3ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 1ms

C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time<1ms TTL=255
Reply from 192.168.1.11: bytes=32 time<1ms TTL=255
Reply from 192.168.1.11: bytes=32 time<1ms TTL=255
Reply from 192.168.1.11: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.3.3

Pinging 192.168.3.3 with 32 bytes of data:

Request timed out.
```

☐ Top

PC-A

Physical Config Desktop Programming Attributes

Command Prompt

```
Pinging 192.168.3.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.3.3: bytes=32 time=2ms TTL=125
Reply from 192.168.3.3: bytes=32 time=11ms TTL=125
Reply from 192.168.3.3: bytes=32 time=3ms TTL=125

Ping statistics for 192.168.3.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 11ms, Average = 5ms

C:\>ping 192.168.3.1

Pinging 192.168.3.1 with 32 bytes of data:

Reply from 192.168.3.1: bytes=32 time=15ms TTL=253
Reply from 192.168.3.1: bytes=32 time=12ms TTL=253
Reply from 192.168.3.1: bytes=32 time=12ms TTL=253
Reply from 192.168.3.1: bytes=32 time=13ms TTL=253

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 12ms, Maximum = 15ms, Average = 13ms

C:\>ping -n 10 192.168.3.3

Pinging 192.168.3.3 with 32 bytes of data:

Reply from 192.168.3.3: bytes=32 time=12ms TTL=125
Reply from 192.168.3.3: bytes=32 time=9ms TTL=125
Reply from 192.168.3.3: bytes=32 time=11ms TTL=125
Reply from 192.168.3.3: bytes=32 time=11ms TTL=125
Reply from 192.168.3.3: bytes=32 time=9ms TTL=125
Reply from 192.168.3.3: bytes=32 time=2ms TTL=125
Reply from 192.168.3.3: bytes=32 time=2ms TTL=125
Reply from 192.168.3.3: bytes=32 time=14ms TTL=125
Reply from 192.168.3.3: bytes=32 time=9ms TTL=125
Reply from 192.168.3.3: bytes=32 time=11ms TTL=125

Ping statistics for 192.168.3.3:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 14ms, Average = 9ms

C:\>
```

☐ Top

```
LOCAL#ping 192.168.3.3

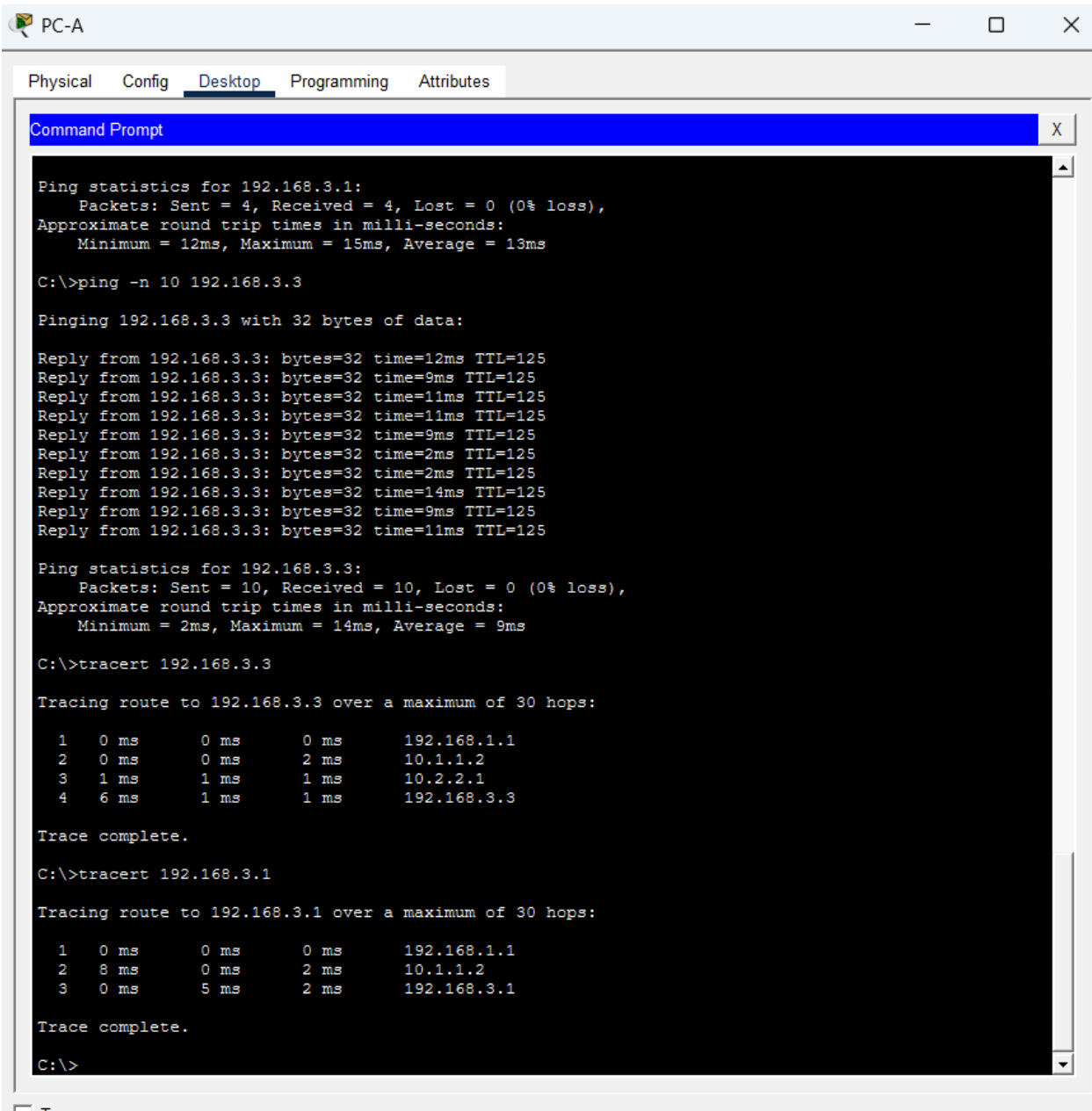
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.3, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 5/7/8 ms

LOCAL#
```

☐ Top

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3. Use Tracert and Traceroute Commands



The screenshot shows a window titled "PC-A" with a tabbed interface. The "Desktop" tab is active, displaying a "Command Prompt" window. The Command Prompt shows the results of several network commands: a ping to 192.168.3.1, a ping to 192.168.3.3, a traceroute to 192.168.3.3, and a traceroute to 192.168.3.1.

```
PC-A
Physical Config Desktop Programming Attributes
Command Prompt X

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 15ms, Average = 13ms

C:\>ping -n 10 192.168.3.3

Pinging 192.168.3.3 with 32 bytes of data:

Reply from 192.168.3.3: bytes=32 time=12ms TTL=125
Reply from 192.168.3.3: bytes=32 time=9ms TTL=125
Reply from 192.168.3.3: bytes=32 time=11ms TTL=125
Reply from 192.168.3.3: bytes=32 time=11ms TTL=125
Reply from 192.168.3.3: bytes=32 time=9ms TTL=125
Reply from 192.168.3.3: bytes=32 time=2ms TTL=125
Reply from 192.168.3.3: bytes=32 time=2ms TTL=125
Reply from 192.168.3.3: bytes=32 time=14ms TTL=125
Reply from 192.168.3.3: bytes=32 time=9ms TTL=125
Reply from 192.168.3.3: bytes=32 time=11ms TTL=125

Ping statistics for 192.168.3.3:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 14ms, Average = 9ms

C:\>tracert 192.168.3.3

Tracing route to 192.168.3.3 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    192.168.1.1
  2  0 ms    0 ms    2 ms    10.1.1.2
  3  1 ms    1 ms    1 ms    10.2.2.1
  4  6 ms    1 ms    1 ms    192.168.3.3

Trace complete.

C:\>tracert 192.168.3.1

Tracing route to 192.168.3.1 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    192.168.1.1
  2  8 ms    0 ms    2 ms    10.1.1.2
  3  0 ms    5 ms    2 ms    192.168.3.1

Trace complete.

C:\>
```

```

LOCAL#ping 192.168.3.3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.3.3, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 5/7/8 ms

LOCAL#traceroute 192.168.3.3
Type escape sequence to abort.
Tracing the route to 192.168.3.3
  1  10.1.1.2          6 msec    5 msec    1 msec
  2  10.2.2.1          8 msec    9 msec    0 msec
  3  192.168.3.3       5 msec    3 msec    5 msec

```

4. Troubleshoot the Topology

Scenario 1: PC-A không ping được PC-C

Các bước kiểm tra:

1. Ping chính PC-A (localhost):

2. ping 192.168.1.3

→ Nếu không phản hồi, vấn đề nằm ở chính PC-A (card mạng hoặc cấu hình IP sai).

3. Ping Default Gateway:

4. ping 192.168.1.1

→ Nếu không phản hồi, cần kiểm tra:

- Cấu hình IP trên PC-A
- Trạng thái interface G0/1 trên router LOCAL
- Kết nối cáp giữa PC-A và router

5. Từ router LOCAL, ping đến router ISP:

6. ping 10.1.1.2

→ Nếu không phản hồi, cần kiểm tra:

- Trạng thái đường truyền serial
- Cấu hình clock rate trên cổng DCE
- Địa chỉ IP trên các cổng serial của hai router

7. Từ router ISP, ping đến router REMOTE:

8. ping 10.2.2.1

→ Nếu không phản hồi, cần kiểm tra kết nối serial giữa ISP và REMOTE.

9. Từ router REMOTE, ping đến PC-C:

10. ping 192.168.3.3

→ Nếu không phản hồi, cần kiểm tra mạng LAN tại phía REMOTE (cáp, IP, gateway).

11. Sử dụng lệnh Traceroute để xác định điểm lỗi:

12. tracert 192.168.3.3

→ Quan sát hop nào bị timeout để xác định vị trí lỗi trên đường truyền.

Scenario 2: Serial Link không hoạt động

Các bước kiểm tra:

1. Kiểm tra trạng thái interface:

2. show ip interface brief

→ Trạng thái cần là *up/up*.

3. Kiểm tra clock rate trên cổng DCE:

4. show controllers serial 0/0/0

→ Xác định bên nào là DCE và đảm bảo có thiết lập clock rate.

5. Kiểm tra cáp serial:

- Đảm bảo đầu DCE và DTE được nối đúng.
 - Cáp sử dụng đúng loại (DTE <-> DCE).
-

Scenario 3: Cấu hình Routing không đúng

Kiểm tra bảng định tuyến:

show ip route

Các route cần có:

- **Router LOCAL:** Route đến mạng 192.168.3.0/24 qua 10.1.1.2.

- **Router ISP:** Route đến cả hai mạng LAN 192.168.1.0/24 và 192.168.3.0/24.
- **Router REMOTE:** Route đến mạng 192.168.1.0/24 qua 10.2.2.2.

Nếu thiếu route, thêm các lệnh sau:

! Trên router LOCAL

```
ip route 192.168.3.0 255.255.255.0 10.1.1.2
```

! Trên router ISP

```
ip route 192.168.1.0 255.255.255.0 10.1.1.1
```

```
ip route 192.168.3.0 255.255.255.0 10.2.2.1
```

! Trên router REMOTE

```
ip route 192.168.1.0 255.255.255.0 10.2.2.2
```

Scenario 4: Cấu hình Default Gateway sai

Kiểm tra trên các máy tính bằng lệnh:

```
ipconfig
```

Giá trị đúng cần có:

- **PC-A:** Default Gateway = 192.168.1.1
- **PC-C:** Default Gateway = 192.168.3.1